A105
CANTOR FITZGERALD
M-SP-1

TAA# 941154
11/8/94

HVAC SPECIFICATIONS

GENERAL REQUIREMENTS

All work shall be free from defects in workmanship and materials for a period of one (1) year from date of final acceptance and shall meet all local and state codes. All defects, which develop or are discovered within this period shall be repaired by the Contractor to the satisfaction of the Engineer and at no additional cost.

"The Contractor shall all work shall comply with codes and regulations listed under section 10, paragraph 11 (A) of the "Construction Review Manual"

GENERAL

1. The Contractor shall examine the site of the proposed work to determine the existing conditions that may affect the work.
2. It is the intention of the Contract Drawings and Specifications to call for finished work, tested and ready for operation. All materials shall be new and of first-quality.
3. All work, incidental accessories or other details not shown but necessary to make the work complete and operational and in all respects ready for operation, even if not particularly specified, shall be provided by the Contractor at no additional cost.
4. The Contract Drawings are generally diagrammatic and are intended to convey the scope of work and indicate general arrangement of ductwork, pouches, and induction units. Existing ducts, pipes, utilities, etc. that are damaged during the construction period, whether or not due to the Contractor's negligence, shall be repaired or replaced by the Contractor and left in a condition satisfactory to the Engineer.
5. Coordinate locations of all diffusers with architectural reflected ceiling plans.
6. The space around pipes, ducts, etc. penetrating rated walls, shall not exceed 1/2" and shall be packed solid with Thermafiber. Mineral Wool or equivalent non combustible material. Perimeter shall be closed off by tight fitting escutcheons on both sides of this construction as required by Sections C26-504.5 (b) of N Y C Building Code.

DUCTWORK

1. All ductwork shall be furnished, installed and fabricated in accordance with the latest edition of the SMACNA "High Velocity Duct Construction Standards Manual, using prime sheets of galvanized steel. All square elbows to be provided with turning vanes on maximum 4" centers. Provide access doors at all fire and smoke dampers for access.
2. All branch and take offs shall be equipped with volume controllers.
3. All round and flexible connections shall be 7" diameter unless otherwise indicated on drawing.
4. Support horizontal ducts with hangers secured to structural steel above at intervals not exceeding 8'0". Install additional steel as required.
5. Flexible connectors to the supply duct and the diffuser plenum of ceiling pouches shall be sealed with 3M Co Duct Tape and clamped with Stainless Steel Ideal Type 52 clamps.
6. All access doors shall be as per latest SMACNA Standards.

ACOUSTICAL DUCT LINER FOR INTERIOR DUCT SURFACES

1. Application
Acoustical duct liner shall be installed on the interior surface of the ductwork from the discharge connection of the HVU for a minimum distance of 10 feet.
2. Ma
a) Or [illegible] glass duct liner board
b) Ins[illegible] adhesive shall have a composite fire and smoke hazard rating as tested by procedure AS[illegible] 723 not exceeding a "Flame Spread" of 25 and a "Smoke Developed" of 50. Jo[illegible] Acoustic A or approved equal
c) Insulation density of 1.5 lbs. per cubic foot with a thermal conductivity of K=0.26 BTU/in/sq ft/deg Fahrenheit at 75 temperature
d) The [illegible] have a NRC of no less than 0.70 based on No. 6 mounting, (Test Method C423) and suitable for [illegible] to 2000 FPM
3. Installation
a) Apply duct liner to duct surfaces with 100% coverage and approved adhesive
b) The [illegible] face of the liner shall face the air stream. All joints shall be snug and neatly butted
c) All exposed edges and joints shall be heavily coated with approved adhesive. A metal nosing shall be installed on all leading edges of the liner
d) On rectangular over 12" in width and/or sizes over 16" in height, additional mechanical fasteners on a maximum of 16" C[illegible] shall be used to fasten the duct liner to the duct. Fasteners shall be installed within 3" of the leading edges of all duct joints. All mechanical fasteners shall be flush with liner surface

INDUCTION UNITS

1. Contractor shall thoroughly clean all existing induction units by means of wire brushing or steam cleaning finned surfaces, removing all dust and debris from plenum chamber, cleaning nozzles and replacing filters. All induction units thermostats shall be thoroughly checked for proper operation and recalibrated where required, or replaced if not functional.
2. The balancing of induction units shall be included in the overall balancing and testing procedures as specified under the heading "BALANCING"

VIBRATION ELIMINATORS

Vibration hangers shall be as manufactured by Mason Industries, Vibration Mounting and controls Inc. or an approved equal.

ACCESS SUPPORTING REQUIREMENTS

1. All supporting steel shall conform to ASTM Designation A-36
2. All nuts shall have lock washers
3. Contractor shall field measure and verify existing conditions.

CEILING DIFFUSERS & GRILLES

Made of [illegible] specified are manufactured by Anemostat or an approved equal. All finishes shall be baked white enamel.

1. [illegible] shall be Model DF with No. 41 core pattern (4-way)
2. [illegible] shall be Model S3HD
3. [illegible] Damper for diffusers shall be Model DOB.

MINI SPLIT AIR CONDITIONING UNITS

1. Ductless air conditioning units. Unit shall be complete with temperature control, compressor, evaporator coil, condenser water regulating valve and other system components required to provide proper air conditioning for the space designated on the Contract Drawings. Filter shall be Class I, UL listed. 45% efficiency.
2. AC Unit shall be furnished with the following accessories:
   a) Condensate Pump
   b) Disconnect Switch
   c) Wall Mounted Control Box thermostat
   d) Auxiliary drain pan & water alarm sensor
3. Schedule

Unit No.	Blower CFM	Motor H.P.	Auxiliary Total Cooling Cap. (Btu) Ext S.P.	80 DB 67 WB	GPM 85 Deg. F.E.W.T.	Make	Model No.	Total Watts(NET)
AC-18	2000	1	0.3	62000	16.2 Gpm	ClimateMaster	HS060	3471bs.

AC Unit motor shall be 3 phase and for 460 volts

4. The Unit shall be factory run, tested and rated in accordance with ARI Standards.
5. AC Unit shall be complete with water regulating valve. Valve shall be Metrix WCCW type or an approved equal. It shall be a positive shut-off type and shall be rated for 150 psi. working pressure.
6. Unit shall be similar or equal to make and model listed and rated at 150 lbs. working pressure.
7. Vibration isolators shall be as manufactured by Vibration Mountings Control Inc. or an approved equal.

PIPING AND ACCESSORIES

A. TEST REQUIREMENTS (Aux. Cooling Water)

Operating Pressure	150 PSIG
Operating Temperature	85 Deg. F - 95 Deg. F
Hydrostatic Test Pressure	1.5 x Operating Pressure
Duration of Test	2 hours

Isolate equipment, controls, instruments and valves from the piping system during hydrostatic tests

B. Piping & Fittings

System	Pipe	Fittings
Aux. Cooling Water Conforming to ASTM A-53 Schedule #40 Grade B, Black Seamless	Black Steel Pipe, 250 lb. class	2-1/2" cast iron screwed
A.C. Unit Condensate Drain Type (L)	Copper ASTM B-88 Hard Temper 5 ANSI B16.18	Wrought Copper Solder Joint

Vent auxiliary cooling water piping at all high points.

C. Accessories
1. Unions for auxiliary cooling water service shall be similar and equal to 250 lb. class, malleable iron with bronze seats, Grinnell Figure 554, UL.
2. Nipples 6" length or less, shall be extra heavy and the material shall be the same as the pipe. Close nipples shall not be used.
3. Braided type flexible connector shall be Vibration Mounting and Control Inc., (VICO) Model MFP Style NE Max 280 psig or approved equal

D. Soldered Joints
95-5 Tin Antimony Solder having a melting point greater than 450 F. Excess solder shall be removed while still in the molten state with a fillet left at the face of the fitting

E. Thermometers
1. Thermometers for piping shall be of the "all angle" (universal), separate socket, industrial type with #304 stainless steel extension neck wells
2. The thermometer for auxiliary cooling shall operate at 0 - 160 Deg. F range and shall include a sufficient safety margin at either end
3. Thermometers shall be as manufactured by Albert A. Weiss, Wekster Instrument Co. Ashcroft or approved equal

F. Pressure Gauges
1. Pressure gauges shall be of the bourdon tube spring type with 4 1/2" dial sizes. Gauges shall have black aluminum cases with black numbers on white background. The gauges shall be as manufactured by Albert A Weiss, Wekster Instrument Co. Ashcroft or approved equal
2. The pressure range for the auxiliary cooling, shall be 0 - 150 psi, and the Bourdon tube shall be Bronze

G. Strainers
Strainers shall be similar and equal to those manufactured by Muller Steam Specialty Co. Screwed "Y" strainers for pipes 2 1/2" and smaller shall be 250 lb. No 11. The screens for the strainers shall be stainless steel. Strainers shall be provided with capped blowdown valves

H. Cutting and Patching, Sleeves and Escutcheons
1. Pipe passing through walls shall have a trim opening cut no greater than necessary for the installation of a *sleeve secured therein. Sleeves shall be 1/2" in diameter larger the outside diameter of the pipe or required* insulation passing through, and of sufficient length to be flush with the finished wall surfaces. Sleeves shall be made of Schedule 40 galvanized steel pipe for concrete block partitions and 20 gauge sheet metal for framed partitions.
2. Pipe passing through floor slabs shall have an opening core drilled 1/2" in diameter larger than the outside diameter of the pipe or required insulation passing through.
3. Annular spaces between piping and sleeves or core drilled floor openings shall be packed with thermafiber and sealed to retain the fire integrity of the walls and floors with a non-hardening compound similar and equal to Duxseal as manufactured by J. M. Clipper Co.
4. All piping passing through walls, floors or ceilings shall be fitted with chromium plated cast brass escutcheons with fastening set screws similar and equal to Fee & Mason Manufacturing Co., F & S Manufacturing Co. or Ritter Pattern and Casting Co.

I. Pipe Supports and Hangers
1. All supports and parts shall conform to the latest requirements of the ANSI Code for pressure piping B31.10 and MSS standard practice SP-58.
2. Hangers shall be manufactured by Grinnell Co., Central Iron, Fee and Mason, Blawknox Co. or an approved equal
3. Pipe hangers, rods, inserts and clamps shall be those approved for their respective uses by the Underwriters' Laboratories, Inc

4. Unless otherwise specifically approved, hanger size and spacing shall be

	Max Hanger Pipe Sizes	Minimum Spacing	Rod Sizes
steel	1/2" to 1"	7 ft o.c	3/8"
	1-1/4" to 2"	9 ft o.c	3/8"
	2-1/2" to 3-1/2"	10 ft o.c	1/2"
	4" to 5"	12 ft o.c	5/8"
	6"	12 ft o.c	3/4"
	8" to 12"	12 ft o.c	7/8"
copper	1/2" to 1-1/4"	6 ft o.c	3/8"
	1-1/2" to 2"	8 ft o.c	3/8"
	2-1/2" to 3-1/2"	10 ft o.c	5/8"

J. Valves

1. Type	Size	Jenkins Pressure	Crane Fig. No.	Stockham Fig. No.	Fig. No.
Gate	Up to 2"	125 psi	47U	428-UB	B-105
Gate	Up to 2"	150 psi.	49U	431	B-128
Gate	Up to 2	300 psi.	280U	634E	B-144
Ball	Up to 3"	300 psi	32A	930-TF	S217-BR-R-T
Plug	4" & Up	300 psi			WA73 OR

2. Balancing valves shall be non-lubricating eccentric plug (ballcentric) type with adjustable stop valve shall be rated for 175 lb.W.O.G. or 400 lb. W.O.G. Valves shall be as manufactured by DeZurik or approved equal
3. Domestic Water
   (a) Gate Valves - Fairbanks Fig. 0250-FB
   (b) Check Valves - Fairbanks Fig. 0640-FB
   (c) Pressure Reducing Valves - J.R. Gunzenhauser, Model # 1130H
   (d) Vacuum Breaker - Watts Regulator Co. Mod. No. 288A.C

K. Pipe and Valve Identification
1. Provide and affix a set of approved adhesive bands identifying the system and direction of flow
2. Each set shall consist of one band on which the name of the service is printed in letters not less than 1 inch high
3. Bands shall be in colors as indicated below and shall conform to ANSI Standard A-13.1

System	Background	Letters and Arrow
Auxiliary Cooled Water	Green	Black

Adhesive bands shall be W.H. Brady Company, Seton Corp. or an approved equal
4. Place a durable metal or plexiglas tags permanently affixed to condenser water shut off valves indicating the tenant name, floor served, and "SUPPLY" or "RETURN". Tag shall be 3" x 6" size with black lettering on a green background.

L. Threaded Joints
Steel pipe threaded joints shall be made tight using only an approved pipe joint compound or tape, placed on the male thread only.

CONDENSATE PUMPS
1. Shall be as manufactured by Little Giant Company model # VCL-24-UL(S), 270 Gallons per hour at 1' head, 120V. 1ø or approved equal
2. AC unit(s) shall be electrically interlocked with their condensate pump so that if the condensate pump is not operating the AC unit shall be locked out, or the AC unit shall shutdown on a high water condition in the condensate drain pan. Contractor shall submit a wiring diagram for all AC equipment showing all control devices including all shutdown functions.

INSULATION FOR CONDENSATE WATER
Insulation 1/2" thick one piece fiberglass, flame spread rating not greater than 25", smoke rating "50" (Insulate fittings.)

AUXILIARY DRAIN PAN REQUIREMENTS
1. Make drain pan 12" Larger than AC units on all four sides with upstanding sides 1 1/2" with 1/2" hem turned down outside of pan. Pans shall be made from 16 ga. galvanized steel with soldered corners made water tight.
2. Install water sensor in drain pan along with necessary controls to sound local alarm and shutdown AC unit when activated by water in the pan.
3. Water alarms shall be "Water Alert" Made By Dorlen, sensor unit model #SS-R (T), remote indicator unit model no. RI-2(T); power supply unit model PS-3 or approved equal. Locate alarms so that they can be easily heard in the occupied area.
4. Place a durable metal sign permanently affix-it to alarm identifying AC unit and to read "When Alarm sounds call 435-4164 weekdays and weekends".

EXECUTION
1. All work in occupied tenant areas shall be performed on other than normal working hours as directed by the Engineer.
2. The Contractor shall notify the Engineer when shut down of existing systems becomes necessary. Shut-down time shall be kept to a minimum.

SHUTDOWNS
Request for shutdowns of main condenser water lines [illegible] be delivered to the Manager, WTC Operations, at least three (3) working days prior to the requested shutdowns and shall be subject to the final approval of the Manager, WTC Operations.

BALANCING
The Contractor shall provide the service of an air balancing and hydronic testing specialist who specializes in Heating, Ventilation and Air Conditioning systems. Perform all balancing in accordance with sheet metal and air conditioning Contractors National Association (SMACNA). Testing shall be performed in the presence of a WTC Construction Inspector. Upon completion and testing of the HVAC System, three (3) copies of the Balancing Report must be submitted to the WTC Construction Supervising Engineer and one (1) copy to the WTC Planning Coordinator.

SUBMITTALS
Submit for approval three (3) sets of shop drawings of ductwork, piping and details of fire damper installation. Submit three (3) sets of catalog cuts for fire dampers, A.C. Units, exhaust fan, ceiling grills, ceiling diffusers, valves, accessories and three (3) copies of air balancing data report.

APPLICABLE STANDARDS, CODES AND PUBLICATIONS
This entire installation shall be manufactured, tested and installed to conform, as a minimum, to provisions of the following codes and standards except where stricter requirements are specified elsewhere herein or shown on the contract drawings.
A. National and New York Electrical Code
B. National Fire Protection Association (N.F.P.A.)
C. New York City Building Code
D. Underwriters Laboratories, Inc. (U.L.)
E. American National Standards Institute Inc. (A.N.S.I.)

CONTROLLED INSPECTION
a. The ventilation system shall not be placed in operation until it has been tested and inspected in accordance with the requirements of the New York City Building Code, section C26-1301.2.
b. The controlled inspection shall be made and witnessed by a licensed professional engineer, employed by the contractor who shall be approved by the Engineer-of-Record, as part of the work of the sub-contract

ESTIMATED SUPPLEMENTAL COOLING LOAD
The estimated supplemental cooling load for this Tenant Alteration Application is 5.16 tons

SPRINKLER SPECIFICATIONS

1. Shutdown of existing system. At the time that such closing or opening of valves and drainDown becomes necessary, the Contractor shall notify the WTC Construction Division (at least 48 hours in advance) *who will make the necessary arrangements. The Contractor shall keep the shutdown* time to a minimum and drainage shall be to a properly connected receptacle without causing damage to other work and property.
2. Heads. Sprinkler Heads shall be Reliable Automatic Sprinkler Co. concealed type Model "G4". 165 degree F rating, 1/2" orifice 85 & A #587 75 SA or approved equal. Polished chrome. New sprinkler heads shall be installed whether heads are shown as new or relocated, as per NFPA 13, Section 1-8.1.1
3. Pipe and Fittings. Piping shall be Schedule 40, standard weight, black steel pipe. ASTM A795/A53. Fittings shall be cast iron, 125 lbs., or malleable iron fittings Class 150.
4. All horizontal piping and fittings within 15'-0" of exterior walls shall be insulated with 1" fiberglass insulation.
5. Piping and fittings shall be insulated where required by the contract drawings with one inch (1") thick heavy density fiberglass pipe covering with factory applied all service jacket (ASJ), self-sealing lap and butt strips bonded with aluminum straps (2' on centers), and pre-molded fiberglass for fittings. Insulation shall be similar in all respects to that manufactured by Owens-Corning Fiberglass. Insulation (including jacket or facing and adhesive) shall have composite fire and smoke hazard ratings, as tested by proceedure ASTM E-84, NFPA 255 and UL 723, not exceeding a flame spread rating of 25 and smoke developed rating of 50.
6. Piping shall be installed to drain back to flow control valve
   a) Loop main shall be above bottom chord of truss
   b) Branch lines shall run through bridging trusses
7. Flushing. Before final connections and sprinkler heads are installed, all piping shall be thoroughly blown out, rodded out, and washed out at least twice in a manner as directed by the Engineer to remove all accumulation of dirt, chips or other deleterious material. Make all temporary connections and furnish all appliances required for the purpose of cleaning at no extra expense to the Authority.
8. Pipe passing through walls shall have a trim opening cut no greater than necessary for the installation of a sleeve secured therein. Sleeves shall be made of Schedule 40 galvanized steel pipe for floor slabs and 20 gauge sheet metal for framed partitions. Sleeves shall be 1/2" in diameter larger the outside diameter of the pipe or required insulation passing through, and of sufficient length to be flush with the finished wall surface. Annular spaces between piping and sleeves or core drilled floor openings shall be packed with thermafiber and sealed to retain the fire integrity of the walls and floors with a non-hardening compound similar and equal to Duxseal as manufactured by J. M. Clipper Co.
9. Hangers. Install suitable clevis type hangers supported from the existing building steel framing. Drilling/anchoring systems will be permitted. Drilling only when approved by the Engineer. Use Hilti HDU anchors.

Pipe Size	Max. Hanger Spacing	Min. Rod Size
1"	8'-0" O.C.	3/8"
1-1/4" to 2"	10'-0" O.C.	3/8"
2-1/2" to 3"	12'-0" O.C.	1/2"

10. All piping shall be installed above the bottom chord of the trusses.
11. Test. Entire installation shall be tested hydrostatically and remain tight with no loss of pressure for a period of no less than two (2) hours against a pressure of 200 psig. Remaining portion of the floor system shall be isolated from the testing procedure. Testing shall be performed in the presence of the Engineer and Port Authority Inspector. At least (48) hours notice shall be given in advance of all tests.
12. Code. Entire installation shall comply with all provisions of the NYC Building Code.
13. Affix identification markers on all sprinkler piping. Markers shall be at 10'-0"on centers. Markers shall be Brady Snap-On, Type 8, W.H. Brady Co. Sign Mark Division. Markers shall read "SPRINKLER PIPING".

14. Disturbance of structural fireproofing shall be kept in a minimum and precaution shall be observed for work above the ceiling.
15. Contractor shall submit detailed shop drawings to the Engineer for approval. No work shall commence until approval is obtained.
16. All unused piping, ductwork, hangers, supports, shall be completely removed all the way back to the core riser closet, or back to the nearest branch main and capped, sealed watertight or airtight. All the openings shall be properly patched, sealed, and fire stopped to maintain the original integrity of the partition's fire rating.
17. Contractor shall provide a hydraulic calculation to verify pipe size. The hydraulic calculation shall include:
   a) available static pressure on the floor.
   b) the minimum water supply requirement density, gpm per square foot
   c) area of hydraulic demand.
   d) occupancy hazard classification.
   e) sprinkler piping and fittings material.
   f) all existing piping sizes.

SIGNED
ILYA ASANOVICH/NTX INTERIORS
GENERAL CONTRACTOR
CERTIFIED "AS BUILT" DRAWING

STATE OF NEW YORK · JOHN C. WESTRICK · 054052 · LICENSED PROFESSIONAL ENGINEER

REV. No.	DESCRIPTION	DATE
2	CERTIFIED AS-BUILT, RESUBMITTED FOR RECORD	4-26-95
1	REVISED AS PER PORT AUTHORITY COMMENTS	11/8/94

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MECHANICAL & SPRINKLER SPECIFICATIONS

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SCALE: NONE | DWN BY: BB | CHK'D BY: JCW
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